

Chapter 5

Medicinal values and phytochemical screening of Torchwood (*Lepisanthes tetraphylla* Radlk.) fruits

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Abstract

Lepisanthes tetraphylla fruits are selected for qualitative phytochemical analysis. Fruits are edible (minor) and have some secondary metabolites. Three extracts of fruits are screened, and detected phytochemicals are presented here to draw attention to the minor edible fruits as future pharmaceutical agents.

Keywords: Minor fruits, secondary metabolites, future pharmaceuticals

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Introduction

Minor edible fruits are very important in rural and tribal diets. Mostly, they are seasonal and local plant species. Rural and tribal communities collect them from nearby forests and consume them as sessional foods. Sometimes, they collect them to sell and store for future consumption. Minor fruits are not only nutritious, but they also have medicinal values. The most common minor edible fruits are *Toddalia asiatica*, *Naringi crenulata*, *Aglaia*

elaeagnoidea, *Alangium salviifolium*, *Ampelocissus latifolia*, *Annona reticulata*, *Antidesma acidum*, *Bridelia retusa*, *Buchanania lanzan*, *Capparis decidua*, *Capparis spinosa*, *Carissa spinarum*, *Cordia dichotoma*, *Diospyros malabarica*, *Ehretia laevis*, *Ficus drupacea*, *Flueggea virosa*, *Lannea coromandelica*, *Mimusopus elengi*, etc (Harikrishna *et al.*, 2023). Among these, *Lepisanthes tetraphylla* is a tree species, and its fruits are edible, which falls under minor edible fruits. It has ethnomedicinal uses. Keeping this in mind, an attempt has been made to screen the secondary metabolites available in fruits. The present study draws attention to its pharmacological potential.

Morphology

It is a small tree; bark light coloured. Leaves paripinnate; rachis and petiole together, leaflets 2 pairs, very variable, narrowly oblong, smaller with cuneate base, or elliptic – oblong, subcordate base, entire, acute or rounded at apex, glabrous; petiolules glabrous or pubescent, young yellow tomentose. Racemiform panicles elongated, often fascicled, axillary or mostly from the old wood, dense – flowered nearly to the base; rachis tomentose. Flowers white, irregular, fascicled. Sepals orbicular or orbicular – oblong, connate at base, 2 posteriors larger, with membranous margins, 2 anterior smaller. Petals oblong, sometimes toothed, villous below and 2-lobed, villous scale at the base; scale with linear forked appendage on its back. Disc anterior. Stamens hypogynous within the disc; filaments villous. Ovary villous – tomentose, obscurely. Drupe coriaceous, yellow tomentose. Seed oblong, exarillate (Saxena and Brahmam, 1994; Figure 1-3).

Methodology

The fruits of *Lepisanthes tetraphylla* were collected from the Khurdha district of Odisha state, India. The plant was identified by the authors. The Soxhlet method of extraction using three solvents (aqueous, methanol, and ethanol) was carried out for phytochemical analysis (Kumar *et al.*, 2013). The detection of nine secondary metabolites was carried out using standard methods (Kumar *et al.*, 2017; Devi *et al.*, 2023).

Qualitative phytochemical analysis

Test for tannin

1 ml of the filtrate of fruit extract was taken. About 3-5 drops of 10% lead acid solution was added into it. The appearance of gelatinous precipitate confirmed the presence of tannins.



Figure 1: Fruits of *Lepisanthes tetraphylla*



Figure 2: Leaves of *Lepisanthes tetraphylla*



Figure 3: Bark and trunk of *Lepisanthes tetraphylla*

Test for saponins

1 ml of the filtrate of fruit extract of *Lepisanthes tetraphylla* was taken. About 1 ml of distilled water was added into it and allowed to shake well. The persistent froth formation after shaking provide the evidence of the saponin.

Test for flavonoids

1 ml of the filtrate of the fruit extract was taken and added 2 ml of 2% NaOH solution and 3 drops of dilute HCL. The colour initially turned to an intense yellow colour with NaOH solution and later become colourless. This change in colour confirmed the positive result for the presence of flavonoids.

Test for terpenoids

1 ml of the filtrate of fruit extract was added with 6 drops of chloroform and place it in the water bath for few minutes. Then 6 drops of concentrated H₂SO₄ were added. The reddish-brown interface confirmed the positive result of the presence of terpenoids.

Test for phenolic compounds

1 ml of the filtrate of the fruit extract was taken. Few drops of 5% Ferric chloride solution were added. The appearance of dark bluish black colour provides the positive result of the test of phenolic compounds.

Test for reducing sugars

1 ml of the filtrate of fruit extract was taken and added 2 drops of Fehling's solution A followed by Fehling's solution B and kept it in water bath for some time. The presence of red orange precipitate confirmed the positive result of the test reducing sugar.

Test for steroids

1 ml of the filtrate of fruit extract was taken. 1 ml of chloroform and 1 ml of concentrated sulphuric acid were added into it. The appearance of upper red and lower yellow with green fluorescence provide the positive result of the test of steroids.

Test for alkaloids

1 l of the filtrate was taken and added 3 to 4 drops of Dragendroff's reagent. The formation of reddish-brown precipitate confirmed the presence of alkaloids.

Test for carbonyl compounds

1 ml of the filtrate of fruit extract was taken and added 3 to 4 drops of 2,4-Dinitrophenylhydrazine reagent. The formation of yellow crystal confirmed the presence of carbonyl compounds.

Results and discussion

The phytochemical analysis revealed that tannin, saponin, flavonoids, terpenoids, phenolic compounds, reducing sugar, steroids, and alkaloids are present in aqueous extract of fruits (Table 1; Figure 6). It was noticed that tannin, saponin, flavonoids, terpenoids, phenolic compounds, reducing sugar, steroids, and alkaloids are also detected in methanolic extract of fruits (Table 1; Figure 5) and it was observed that tannin, saponin, flavonoids, terpenoids, phenolic compounds, reducing sugar, steroids, and alkaloids also present in ethanolic extract (Table 1; Figure 4). *L. tetraphylla* are widely utilized in traditional and folk medicinal systems. It has been used for centuries for the treatment of ailments or symptoms such as pain, dizziness, high fever, frequent passing of watery stool (diarrhoea), abscess, and healing of cuts and wounds (Tarmizi *et al.*, 2022).

Table 1: Phytochemical analysis of different extracts of *L. tetraphylla* fruits

Bioactive compounds	Solvents		
	Aqueous	Methanol	Ethanol
Tannin	+ve	+ve	+ve
Saponin	+ve	+ve	+ve
Flavonoids	+ve	+ve	+ve
Terpenoids	+ve	+ve	+ve
Phenolic compounds	+ve	+ve	+ve
Reducing sugars	+ve	+ve	+ve
Steroids	+ve	+ve	+ve
Alkaloids	+ve	+ve	+ve
Carbonyl compounds	-ve	-ve	-ve



Figure 4: Phytochemical screening of ethanolic fruit extract

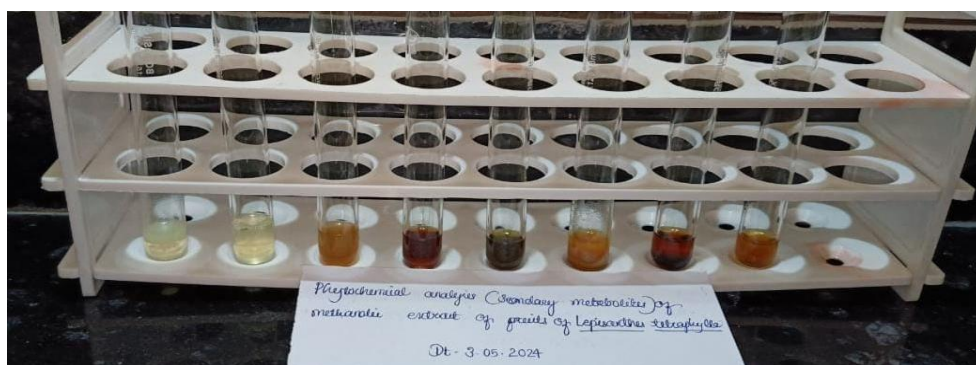


Figure 5: Phytochemical screening of methanolic fruit extract

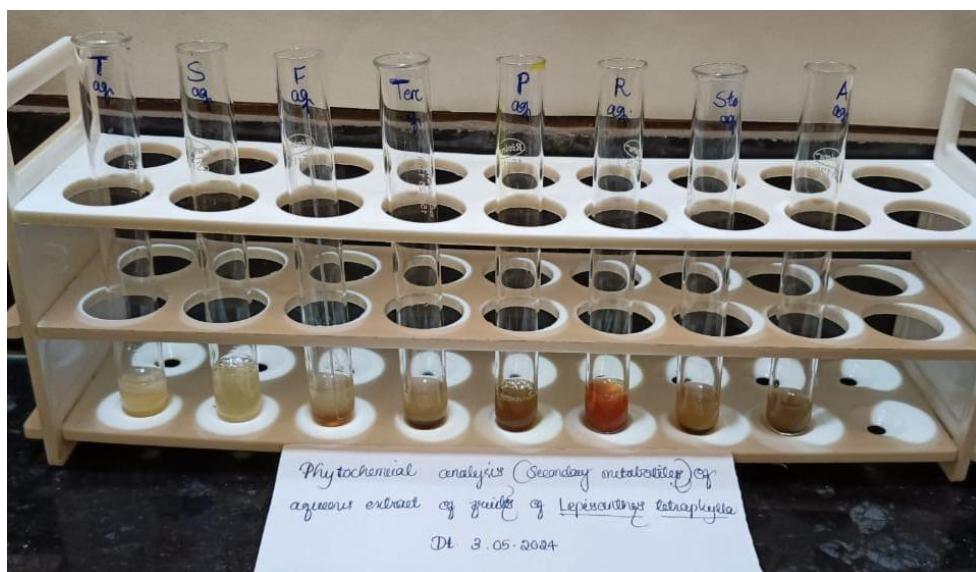


Figure 6: Phytochemical screening of aqueous fruit extract

Conclusion

Present study concludes that there are number of minor edible fruits are available in India having food and medicinal values but they are unexplored in pharmacological aspects like *Lepisanthes tetraphylla*. Phytochemical screening revealed that fruits have diverse secondary metabolites and could be a potential pharmaceutical agent.

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